REMARKS

Claims 1-15 and 17-33 remain pending in the present Application. Claims 1-13 and 27-31 have been withdrawn from consideration by the Examiner, leaving claims 14, 15, 17-26, 32, and 33 for consideration in the present amendment. Claims 14 and 19 have been amended to provide greater clarity to the claim language. No new matter is believed to have been entered by these amendments.

Reconsideration and allowance of the claims are respectfully requested in view of the following remarks.

Claim Rejection Under 35 USC 112

Claims 14, 15, 17-26, 32 and 33 stand rejected under 35 USC 112, second paragraph, as being indefinite. Applicants respectfully traverse.

Claims 14 and 19 have been amended to provide greater clarity, thereby rendering the rejection moot. The medium of interest contains a solid material, a gaseous byproduct, or combinations thereof removed from the work-piece. The electromagnetic energy source excites the medium of interest so as to volatilize the solid material when present. As discussed in Applicants' background section, partial sublimation of photoresist can occur during plasma mediated ashing, which can introduce solid materials into the gas as it gets pumped out of the reaction chamber. Depending on the plasma forming conditions, the solid material can be completely volatized in the reaction chamber, and thus, no change in impedance is detected downstream.

Accordingly, the rejection should be withdrawn.

Claim Rejections Under 35 U.S.C. § 102(b)

Claims 14, 15, 17-20, 22-26, 32 and 33 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by Raoux (US Pat. No. 7,004,107). Applicants respectfully traverse this rejection.

Raoux fails to disclose each and every element of independent claims 14 or 19. In Claim 14, Raoux fails to disclose a material detection system comprising, *inter alia*, a volatilizing electromagnetic energy source downstream from the plasma processing chamber coupled to the flow path for exciting said medium of interest so as to volatize the solid material when present. With regard to claim 19, there is no disclosure of, *inter alia*, a volatilizing electromagnetic energy source coupled to an effluent carrying conduit downstream from a plasma processing chamber. Although Raoux discloses a RF power supply 5 that includes high frequency RF source 12 connected to a high frequency impendence match unit 13 and low frequency source 17, there is no disclosure that the high frequency RF source 12 or the low frequency source 17 is downstream from the plasma processing chamber as in claim 14 or coupled to an effluent as in claim 19.

First, it should be apparent that Raoux is generally directed to a PECVD apparatus configured for both high and low temperature processing. Raoux's PECVD apparatus employs mixed frequency RF power (high and low frequencies) and includes a gas distribution manifold with conical holes as opposed to the straight holes used in the prior art. To accomplish this, the RF power supply 5 (referred to in the Office Action as the "volatilizing electromagnetic energy source) is connected to a gas manifold 40 and to an electrode embedded within pedestal 32 to provide high and low radio frequencies. The gas manifold 40 and the pedestal 32 reside *within* the process chamber 30. There is no disclosure of a volatilizing electromagnetic energy source downstream from the plasma processing chamber as in claim 14 or coupled to an effluent conduit as in claim 19, which is clearly evident by simply reviewing Raoux's FIG. 1, reproduced below.

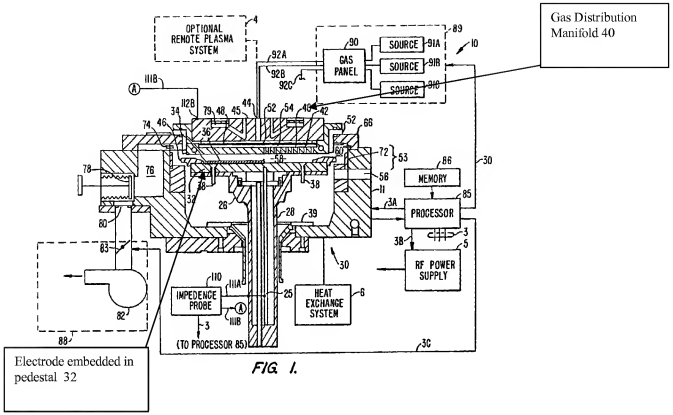

FIG. 1.

As shown, the RF power supply 5 is not downstream from the plasma chamber or coupled to the effluent conduit. Rather, the RF power source 5 is configured to generate plasma within the reactor chamber 30.

> Referring to FIG. 1, a CVD system 10 according to the present invention includes a reactor chamber 30, a vacuum system 88, a gas delivery system 89, an RF power supply 5, a heat exchange system 6, a ceramic pedestal 32 and a processor 85 among other major components. Of particular interest to the discussion of the present invention is the configuration of a gas distribution manifold (also referred to as an inlet manifold and as a "showerhead") 40 that introduces process gases supplied from gas delivery system 89 into a reaction zone 58 of chamber 30 and the configuration and ***connections of RF power supply 5 to manifold 40 and to an electrode embedded within pedestal 32***.

(Raoux, Col. 6, ll. 9-20, emphasis added)

In Raoux's FIG. 5, a schematic circuit diagram of an external RF circuit is shown. The circuit "includes a high frequency RF source 12 and a low frequency source 17. The circuit inputs

high frequency RF power to gas distribution manifold 40 of chamber 30 shown in FIG. 1 and inputs low frequency RF power to RF electrode 22 embedded in substrate holder 32." (see Raoux, Co. 8, line 66 to Col. 9, line 4; see also FIG. 5).

As shown in Figure 5 (reproduced below), the impedance probe 110 is employed to provide accurate ion bombardment of the substrate within the chamber 30. The impedance probe 110 is electrically connected *to the chamber30* by two lines 111A and 111B. Line 111A is connected to an input terminal 112A that is in electrical contact with lower electrode 22 embedded within pedestal 32, while line 111B is connected to input terminal 112B that is in electrical contact with the upper electrode, face plate 40. (see Raoux, Col. 18, ll. 32-38)

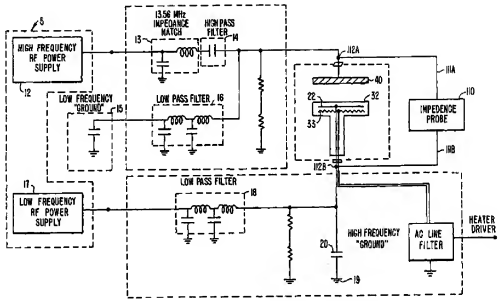

FIG. 5

According to Raoux, " the impedance probe 110 can be used to monitor the impedance *of the reactor* during substrate processing, and if appropriate, processor 85 can adjust processing conditions or the setting of impedance tuner 108 (e.g.: if the impedance tuner is a variable capacitor, adjust the capacitance of the variable capacitor) to compensate for any change in reactor impedance. This is particularly useful because, as discussed above, in some processes the

impedance of reactor 30 has a definite effect on film properties such as WER stress, deposition rate, refractive index and film thickness uniformity." (see Raoux, Col. 18, ll., 40-50). There is no disclosure that the impedance value corresponds to an amount of solid material within the medium of interest as alleged in the Office Action. More importantly, there is no disclosure of a volatilizing electromagnetic energy source downstream from the plasma processing chamber so as to volatilize the solid material contained therein. Rather, the RF source 5 is used to generate plasma within the reaction chamber 30 of the PECVD apparatus and the impedance probe serves to monitor the reaction conditions therein.

In view of the foregoing, the rejection is improper and should be withdrawn.

Claim Rejections Under 35 U.S.C. § 103(a)

Claim 21 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Raoux. Applicants respectfully traverse this rejection.

Claim 21 depends from claim 19 and as such, includes all of the features found in the base claim. As discussed above, Raoux fails to teach or even suggest a volatilizing electromagnetic energy source coupled to an effluent carrying conduit downstream from a plasma processing chamber. In Raoux, the RF source 5 is used to generate plasma within the reaction chamber 30 of the PECVD apparatus and the impedance probe 110 serves to monitor the reaction conditions therein. This is markedly different from Applicants claimed apparatus.

In view of the forgoing, the rejection is requested to be withdrawn.

It is believed that the foregoing remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

The Examiner is invited to contact Applicant's attorneys at the below listed telephone number regarding this Amendment or otherwise regarding the present application.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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